

--FIG. 4 shows a flow chart for implementing the present invention.--

Page 36, after line 10, and before the paragraph starting with "The construction process of the spread-spectrum access", insert the following new paragraph:

--FIG. 4 shows a flow chart for the present invention. In FIG. 4, a pair of orthogonal complementary code groups (C1, S1), (C2, S2) are selected. Each code within the orthogonal complementary code groups is spread with data X1, X2. The resulting spread-spectrum signal is sent over a communications channel. At a receiver, as shown in FIG. 4, the received spread-spectrum signals are despread, generating outputs Y1, Y2.--

IN THE CLAIMS:

1. (currently amended) A ~~construction method of the spreading used by a radio system, for generating spread spectrum multiple access codes with a zero correlation window, wherein the method includes the following steps comprising the steps of:~~

selecting a pair of ~~basically~~ orthogonal complementary code groups (C1, S1), (C2, S2) with each code within the orthogonal complementary code groups having a code length as with N chips, where N is a number of chips, in which the ~~acyclic auto-correlation and cross-correlation functions of code C and~~

~~code S oppose each other but also complement each other except~~
~~at the an origin, the with~~ values of auto-correlation and cross-
correlation functions after ~~summarization are~~ summation being
zero except at the an origin; and

~~based on the actually required maximum number of~~
~~subscriber accesses, spreading, using a tree structure, based on~~
~~a required maximum number of subscriber accesses, codes from the~~
~~the code length and a code number of the basically~~ orthogonal
complementary code group ~~in a tree structure, the with~~ values of
auto-correlation functions of each code of the ~~spread~~ spread
orthogonal complementary code group ~~are being~~ zero except at the
origin, ~~while with~~ the cross-correlation functions of each code
of the orthogonal complementary code group forming the a zero
correlation window about the origin, ~~with the window size~~
~~greater than or equal to $2N-1$.~~

2. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 1, ~~wherein with the spreading step forming the zero~~
correlation window with the size of the zero correlation window
is greater than or equal to ~~the a~~ maximum relative time delay
inside each access code of the radio system ~~or between them, the~~
maximum relative time delay is being dependent on the a
summation of the maximum time dispersion of the channel and the
timing error of the radio system.

3. (currently amended) The ~~construction~~ method of the ~~spreading~~ used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 1, ~~wherein~~ further comprising the steps of:

transmitting the above data bits modulated by codes C1 and C2, e and the data bits modulated by codes S1 and S2, s are ~~transmitted~~ respectively, by using two orthogonal ~~and fading~~ ~~synchronously~~ transmission channels, ~~and carrying the same data bits when modulation, and~~

~~combining while the outputs~~ from the two orthogonal transmission channels ~~are added together~~ after de-spreading and demodulating the data bits ~~demodulation.~~

4. (currently amended) The ~~construction~~ method of the ~~spreading~~ used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 1, ~~wherein the~~ with the step of spreading the code length and code number of the ~~basically~~ orthogonal complementary code group in a tree structure ~~refers to. If~~ includes the step of generating (C1, S1), (C2, S2) as follows: ~~is a pair of~~ ~~basically orthogonal complementary code group with code length~~ N, ~~the two pairs of orthogonal complementary code group with~~ each code length 2N can be generated in the following way:

		C1	C2	S1	S2	
C1	S1	[C1	-C2	S1	-S2
C2	S2		C2	C1	S2	S1
			C2	-C1	S2	-S1

~~wherein~~ with the values of the auto-correlation functions of the orthogonal complementary code group formed on upper and lower trees after spread ~~will be~~ zero everywhere except at the origin, ~~while~~ with values of the cross-correlation functions ~~will form~~ forming a Zero Correlation Window around the origin with the size of the window greater than or equal to $2N-1$.

5. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 4, ~~wherein the above spread can be kept going on with the~~ step of spreading including the step of generating, using in ~~accordance with the tree structure, so as to generate~~ 2^{n+1} orthogonal complementary code groups with the code length equal to $N2^n$ and the width of the zero correlation window greater than or equal to $2N-1$, in which $n = 0, 1, 2, \dots$ is ~~the~~ a number of spread times.

6. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~

claim 4 or 5, ~~wherein the~~ with the step of spreading including the step of spreading with an equivalent transformation ~~can be~~ applied to the ~~resultant~~ orthogonal complementary code group.

7. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 6, ~~wherein the~~ with the step of spreading including the step of swapping ~~equivalent transformation can be swap of the~~ forward and backward position of the ~~resultant~~ orthogonal complementary code group.

8. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 6, ~~wherein the~~ with the step of spreading including the step of swapping ~~equivalent transformation can be swap of the~~ up and down position of the resultant orthogonal complementary code group.

9. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 6, ~~wherein the~~ with the step of spreading including the step of negating ~~equivalent transformation can be negation of~~ code order of each code.

10. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 6, ~~wherein the~~ with the step of spreading including the
step of interlacing ~~equivalent transformation can be~~
~~interlacement of polarity of each code bit.~~

11. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 6, ~~wherein the equivalent transformation can be rotation of~~
with the step of spreading including the step of rotating each
code bit in a complex plane in a sequence or without sequence.

12. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 6, ~~wherein the transformation can be any wherein the~~ with
the step of spreading including the step of transforming with an
equivalent transformation ~~that is proven in~~ from mathematics.

13. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 1, ~~wherein the~~ with the step of spreading including the
step of spreading with a pair of ~~basically~~ orthogonal

complementary code group (C1, S1), (C2, S2) ~~refers to that~~ with the auto-correlation function and cross-correlation function, is respectively, the summation of ~~acyclic~~ auto-correlation with cross-correlation functions between codes C, and the summation of ~~acyclic~~ auto-correlation with cross-correlation functions between codes S.

14. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 13, ~~wherein the~~ with the step of spreading including the step of generating a code length and the width of the zero correlation window of the pair of ~~basically~~ orthogonal complementary code groups ~~can be~~ spread in the following way:

			C1	C2	S1	S2
			C1	-C2	S1	-S2
			C2	C1	S2	S1
			C2	-C1	S2	-S1

wherein if each code length of the pair of ~~basically~~ orthogonal complementary code group (C1, S1), (C2, S2) is N, and the width of the zero correlation window is L, then each code length of the spread pair of ~~basically~~ orthogonal complementary code group will

be $2N$, ~~while~~ with the width of the zero correlation window ~~will~~
~~be~~ $2L+1$.

15. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 14, ~~wherein~~ with the step of spreading including the step
of spreading, when $N = 2$, the pair of ~~basically~~ orthogonal
complementary code group as follows ~~will be~~:

(++ ' +-)

(-+ ' --)

wherein "+" means +1 and "-" -1, while the width of the zero
correlation window will be 3.

16. (currently amended) The ~~construction method of the~~
~~spreading used by the radio system, for generating spread~~
spectrum multiple access codes as set forth in ~~according to the~~
claim 14 or 15, ~~wherein the above spread can be kept going on in~~
~~accordance with the~~ with the step of spreading including the step
of spreading with a tree structure so as to generate 2^n pairs of

orthogonal complementary code groups with the code length $N2^n$ and the width of the zero correlation window as $2^nL+2^{n-1}+2^{n-2}+2^{n-3}+\dots+2^1+1$, in which $n = 0, 1, 2, \dots$ is ~~the~~ a number of spread times.

17. (currently amended) The ~~construction method of the spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in according to the claim 16, wherein the~~ with the step of spreading including the step of spreading with an equivalent transformation ~~can be applied to the resultant basically~~ orthogonal complementary code group.

18. (currently amended) The ~~construction method of the spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in according to the claim 17, wherein the~~ with the step of spreading including the step of swapping equivalent transformation can be swap of the a forward and backward position of the ~~resultant~~ orthogonal complementary code group.

19. (currently amended) The ~~construction method of the spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in according to the claim 17, wherein the~~ equivalent transformation can be swap of with the step of spreading including the step of swapping the up

and down position of the ~~resultant~~ orthogonal complementary code group.

20. (previously presented) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 17, ~~wherein the~~ with the step of spreading including the step of negating ~~equivalent transformation can be negation of~~ code order of each orthogonal complementary code group.

21. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 17, ~~wherein the equivalent transformation can be~~ interlacement of with the step of spreading including the step of interlacing polarity of each code bit.

22. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in ~~according to the~~ claim 17, ~~wherein the equivalent transformation can be rotation~~ of with the step of spreading including the step of rotating each code bit in complex plane in a sequence or without sequence.

23. (currently amended) The ~~construction method of the~~ spreading used by the radio system, for generating spread

spectrum multiple access codes as set forth in ~~according to the~~
claim 17, ~~wherein the~~ with the step of spreading including the
step of transforming with an ~~transformation can be any~~ equivalent
transformation ~~that is proven in~~ from mathematics.

24. (currently amended) The ~~construction method of the~~
~~spreading~~ used by the radio system, for generating spread
spectrum multiple access codes as set forth in ~~according to the~~
claim 3, wherein the orthogonal ~~and fading synchronously~~
transmission channel ~~refers to the~~ includes an orthogonal
polarized wave.

25. (currently amended) The ~~construction method of the~~
~~spreading~~ used by the radio system, for generating spread
spectrum multiple access codes as set forth in ~~according to the~~
claim 3, wherein the orthogonal ~~and fading synchronously~~
transmission channel ~~is the~~ includes time slots without overlap
to each other.

26. (currently amended) The ~~construction method of the~~
~~spreading~~ used by the radio system, for generating spread
spectrum multiple access codes as set forth in ~~according to the~~
claim 1, ~~wherein~~ with the step of spreading including the step of
spreading with one code or multiple access codes ~~can be~~
~~allocated~~ based on the needs of the different data rate and

services of each subscriber to actualize ~~the~~ a different quality of priority level services.

27. (currently amended) The ~~construction method of the~~
~~spreading~~ used by the radio system, for generating spread
spectrum multiple access codes as set forth in ~~according to the~~
claim 1, ~~wherein the~~ with the step of spreading including the
step of spreading with a required spreading spectrum access codes
adaptively generated based on the zero correlation window
required by ~~the~~ different propagation modes, different number of
subscribers, and ~~the~~ needs of different data rate and ~~as well as~~
services, ~~so that there are~~ thereby no inter-signal interference
(ISI) and multi access interference (MAI) are in the
corresponding spreading spectrum CDMA system.

28. (currently amended) The ~~construction method of the~~
~~spreading~~ used by the radio system, for generating spread
spectrum multiple access codes as set forth in ~~according to the~~
claim 1, ~~wherein the~~ with the step of spreading including the
step of spreading with a resultant multiple access codes by the
equivalent transformation can be used to meet the needs of
network configuration, handoff and enhancement of system
capacity, ~~etc~~ in cellular mobile or fixed point to multi points
wireless telecommunications system.

29. (currently amended) The ~~construction method of the spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in according to the claim 1, wherein with the step of spreading including the step of spreading with a coding can be made, as one of the complex codes~~, by using complex codes.

30. (currently amended) The ~~construction method of the spreading used by the radio system, for generating spread spectrum multiple access codes as set forth in according to the claim 1, wherein it can be applied to any further including any of TD/CDMA, FD/CDMA, WD/CDMA, SD/CDMA or CDMA communications system.~~

31. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 1, with the spreading step forming the zero correlation window about the origin with the size the zero correlation window greater than or equal to $2N-1$.

32. (new) A method used by a radio system, for generating spread spectrum multiple access codes with a zero correlation window, comprising the steps of:

selecting a pair of complementary code groups (C1, S1), (C2, S2) with each code within the complementary code groups

having a code length with N chips, where N is a number of chips;
and

spreading codes from the complementary code groups,
with values of auto-correlation functions of each code of the
complementary code groups being zero except at the origin, with
the cross-correlation functions of each code of the complementary
code groups forming the zero correlation window about the origin.

33. (new) The method used by the radio system, for
generating spread spectrum multiple access codes as set forth in
claim 32, with the spreading including the step of step forming
the zero correlation window with a size of the zero correlation
window greater than or equal to a maximum relative time delay
inside each access code of the radio system.

34. (new) The method used by the radio system, for
generating spread spectrum multiple access codes as set forth in
claim 32, further comprising the steps of:

transmitting data bits modulated by codes C1 and C2,
and the data bits modulated by codes S1 and S2, respectively, by
using two orthogonal transmission channels, and

combining outputs from the two orthogonal transmission
channels after de-spreading and demodulating the data bits.

35. (new) The method used by the radio system, for
generating spread spectrum multiple access codes as set forth in

claim 32, with the step of spreading the code length and code number of the complementary code group in a tree structure includes the step of generating (C1, S1), (C2, S2) as follows:

$$\begin{array}{cc} & \begin{array}{cccc} C1 & C2 & S1 & S2 \end{array} \\ \begin{array}{cc} C1 & S1 \\ C2 & S2 \end{array} & \left[\begin{array}{cccc} C1 & -C2 & S1 & -S2 \\ C2 & C1 & S2 & S1 \\ C2 & -C1 & S2 & -S1 \end{array} \right] \end{array}$$

with the values of the auto-correlation functions of the complementary code group formed on upper and lower trees after spread zero everywhere except at the origin, with values of the cross-correlation functions forming a zero correlation window around the origin with the size of the window greater than or equal to $2N-1$.

36. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 35, with the step of spreading including the step of generating, using the tree structure, 2^{n+1} complementary code groups with the code length equal to $N2^n$ and the width of the zero correlation window greater than or equal to $2N-1$, in which $n = 0, 1, 2, \dots$ is a number of spread times.

37. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in

claim 35 or 36, with the step of spreading including the step of spreading with orthogonal or quasi-orthogonal chip-sequence signals.

38. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 37, with the step of spreading including the step of swapping forward and backward positions of the complementary code group.

39. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 37, with the step of spreading including the step of swapping up and down positions of the complementary code group.

40. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 37, with the step of spreading including the step of negating code order of each code.

41. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 37, with the step of spreading including the step of interlacing polarity of each code bit.

42. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 37, with the step of spreading including the step of rotating each code bit in a complex plane.

43. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 37, with the step of spreading including the step of spreading with orthogonal or quasi-orthogonal chip-sequence signals.

44. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 32, with the step of spreading including the step of spreading with a pair of orthogonal complementary code group (C1, S1), (C2, S2).

45. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 44, with the step of spreading including the step of generating a code length and the width of the zero correlation window of the pair of complementary code groups spread as follows:

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$$\begin{array}{cc} & \begin{array}{cccc} C1 & C2 & S1 & S2 \end{array} \\ \begin{array}{cc} C1 & S1 \\ C2 & S2 \end{array} & \left[\begin{array}{cccc} C1 & -C2 & S1 & -S2 \\ C2 & C1 & S2 & S1 \\ C2 & -C1 & S2 & -S1 \end{array} \right] \end{array}$$

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wherein if each code length of the pair of orthogonal complementary code group (C1, S1), (C2, S2) is N, and the width of the zero correlation window is L, then each code length of the spread pair of orthogonal complementary code group will be 2N, with the width of the zero correlation window 2L+1.

46. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 45, with the step of spreading including the step of spreading, when N = 2, the pair of orthogonal complementary code groups as follows:

$$\begin{pmatrix} ++ & ' & +- \end{pmatrix}$$

$$\begin{pmatrix} -+ & ' & -- \end{pmatrix}$$

wherein "+" means +1 and "-" -1, while the width of the zero correlation window will be 3.

47. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 45 or 46, with the step of spreading including the step of spreading with a tree structure so as to generate 2^n pairs of complementary code groups with the code length $N2^n$ and the width of the zero correlation window as $2^n L + 2^{n-1} + 2^{n-2} + 2^{n-3} + \dots + 2^1 + 1$, in which $n = 0, 1, 2, \dots$ is a number of spread times.

48. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 47, with the step of spreading including the step of spreading with an equivalent transformation to the orthogonal complementary code group.

49. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 48, with the step of spreading including the step of swapping forward and backward positions of the orthogonal complementary code group.

50. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 49, with the step of spreading including the step of swapping the up and down position of the orthogonal complementary code group.

51. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 48, with the step of spreading including the step of negating code order of each orthogonal complementary code group.

52. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 48, with the step of spreading including the step of interlacing polarity of each code bit.

53. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 48, with the step of spreading with orthogonal or quasi-orthogonal chip-sequence signals.

54. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 48, with the step of spreading including the step of transforming with an equivalent transformation from mathematics.

55. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 34, wherein the orthogonal transmission channel includes an orthogonal polarized wave.

56. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 34, with the step of transmitting with the orthogonal transmission channel including the step of transmitting using time slots.

57. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 32, with the step of spreading including the step of spreading with one code or multiple access codes based on requirements of the different data rate and services of each subscriber to actualize a different quality of priority level services.

58. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in claim 32, with the step of spreading including the step of spreading with spread spectrum access codes adaptively generated based on the zero correlation window required by different propagation modes, different number of subscribers, and needs of different data rate and services, thereby no inter-signal interference (ISI) and multi access interference (MAI) are in a corresponding spreading spectrum CDMA system.

59. (new) The method used by the radio system, for generating spread spectrum multiple access codes as set forth in